REMARKS

As an initial matter, Applicant gratefully acknowledges the Examiner's determination that claim 7 contains allowable subject matter (Office Action, dated August 30, 2002, page 6, lines 15-18).

As another initial matter, Applicant has submitted proposed drawing changes in a separate paper attached herewith in accordance with 37 C.F. R. 1.121, which Applicant believes satisfies the Examiner's requirements directed to Figures 1A and 2C (Office Action dated August 30, 2002, page 2, lines 2-7). However, Figures 3A, 3B, 4A, 4B, 5A and 5B of the present application are illustrations of hypothetical modifications that could be made to the prior art display assembly (present specification, page 6, lines 21-22). This is not an admission that such hypothetical modifications are prior art, or that they would have been obvious to those of ordinary skill in the art. These hypothetical modifications are solely discussed to show that the subject matter of the presently claimed invention would not be obvious over the prior art disclosed in Figures 1A, 2A, 2B and 2C.

The specification has been amended to include section headings in accordance with 37 C.F.R. 1.77.

Claims 5 and 6 have been canceled without prejudice. Claims 1, 2, 4, and 7-10 have been amended, and new claims 13-19 added. Specifically, claim 1 has been amended to improve clarity and to incorporate the subject matter of original claim 5. Thus, claim 1 as amended, has the scope of original claim 5, and the additional amendments to claim 1 do not narrow the claim related to any substantial issue of patentability.

Claims 2, 4, and 7, 8 and 10 have been amended to improve clarity and these amendments do not narrow the claim related to any substantial issue of patentability. Claim 9 has been amended to particularly point out and distinctly claim the subject matter of this embodiment in accordance with 35 U.S.C. 112.

New claim 13 incorporates the subject matter of original claims 1 and 6. Claims 14-19 all depend directly or indirectly upon claim 13 and correspond to the subject matter of claims 2-4 and 7-9.

The present amendment adds no new matter to the application.

The Invention

The present invention pertains broadly to a display assembly, such as would be used in a timepiece, having two superposed display devices for displaying information by inverting the contrast of all or part of the information displayed between the two display devices. Specifically, in a first embodiment in accordance with the present invention, a display assembly with two superposed contrast inversion display devices including a first display device, a second active display device having a double structure, one structure being formed by a first contrast inversion display device provided by a liquid crystal dot matrix display cell or by a digit liquid crystal display cell, the liquid crystals of the one structure being confined in a space delimited by two transparent substrates and having two switching states, and the other structure being formed by a second contrast inversion display device provided by a liquid crystal optical valve, the liquid crystals of the other structure being confined in a space delimited by two transparent substrates and having at least two switching states and control means allowing an appropriate voltage to be selectively applied to the display cell and optionally to all or part of the valve to cause each liquid crystal to switch from one state to another, wherein a first absorbent or reflective front polariser is arranged at the front of the display cell and in that a second back polariser, crossed with the front polariser or parallel thereto, is arranged at the back of the valve so that when the display cell is switched to display at least one item of data, the total or partial switching of the valve, from one state to another, inverts the contrast of the data displayed from a light appearance to a dark appearance or vice versa, wherein the first display device has a dark shade and the back polariser is a reflective polariser, and wherein the first contrast inversion display device and the second contrast inversion display device are superposed.

In accordance with a second embodiment of the invention, a display assembly with two superposed contrast inversion display devices including a first display device, a second active display

device having a double structure, one structure being formed by a first contrast inversion display device provided by a liquid crystal dot matrix display cell or by a digit liquid crystal display cell, the liquid crystals of the one structure being confined in a space delimited by two transparent substrates and having two switching states, and the other structure being formed by a second contrast inversion display device provided by a liquid crystal optical valve, the liquid crystals of the other structure being confined in a space delimited by two transparent substrates and having at least two switching states and control means allowing an appropriate voltage to be selectively applied to the display cell and optionally to all or part of the valve to cause each liquid crystal to switch from one state to another, wherein a first absorbent or reflective front polariser is arranged at the front of the display cell and in that a second back polariser, crossed with the front polariser or parallel thereto, is arranged at the back of the valve so that when the display cell is switched to display at least one item of data, the total or partial switching of the valve, from one state to another, inverts the contrast of the data displayed from a light appearance to a dark appearance or vice versa, wherein the first display device has a light shade and the back polariser is an absorbent polariser, and wherein the first contrast inversion display device and the second contrast inversion display device are superposed.

Various other embodiments in accordance with the present invention are the subject of the dependant claims. One advantage of the embodiments in accordance with the present invention is that a display assembly, such as would be used in a timepiece, is provided that has two superposed display devices that display dark indicia on a light background or light indicia on a dark background thereby providing an aesthetically pleasing and easy to read information display of various data, such as time data and the like.

The Rejection

Claim 9 stand rejected under 35 U.S.C. 112, second paragraph, as indefinite.

Claims 1-6 and 8-12 stand rejected under 35 U.S.C. 103(a) as unpatentable over "Applicant's admitted prior art" (Applicant's specification, page 1, line 16 to page 5, line 2, Figures 1A and 2-5).

Applicant respectfully traverses the rejection and requests reconsideration of the application for the following reasons.

Applicant's Arguments

Applicant asserts that claims 1-4 and 7-19 are in compliance with 35 U.S.C. 112.

Applicant's specification discusses the background of the invention from page 1, line 3 to page 5, line 2. In this discussion, Applicant discusses prior art display assemblies as shown in Figures 1A, 2A, 2B and 2C. Applicant also discusses "modifications which may be made to the display assembly of the prior art" (page 6, lines 21-22); however, the embodiments shown in Figures 3A, 3B, 4A, 4B, 5A and 5B are not admitted to be prior art or obvious to those skilled in the art. Applicant's characterization of the subject matter of Figures 3A, 3B, 4A, 4B, 5A and 5B as "modifications which may be made to the display assembly of the prior art" does not communicate that such modifications have, in fact, been made, or that they are taught by the prior art. The discussion related to Figures 3A, 3B, 4A, 4B, 5A and 5B is solely intended to point out that further modifications leading to the subject matter of the presently claimed invention would not have been obvious.

Even if the Examiner were to misconstrue the subject matter of Figures 3A, 3B, 4A, 4B, 5A and 5B as "prior art," the subject matter of independent claims 1 and 13 would not be obvious for the following reason. The prior art display assemblies and the hypothetical (non-prior art) modifications do not teach "two superposed contract inversion display devices" as recited in claims 1 and 13.

All of the embodiments shown in Figures 1A, 2A, 2B, 2C, and, non-prior art Figures 3A, 3B, 4A, 4B, 5A and 5B include a polariser (42) sandwiched between a display cell (26) and an optical valve (28). The object of the present invention is to provide a display assembly that includes two superposed display devices allowing an inversion of contrast of one of the displays without increasing energy requirement and without requiring a complex polarizer drive (present specification, page 5, lines 3-7). In other words, the presently claimed invention does not permit the presence of a polarizer between the display cell and the optical valve.

Specifically, the instant specification defines that "[t]he actual construction of the two superposed display devices...corresponds to what was already described with reference to Fig 1A, with the exception of intermediate polariser 42 which has been omitted (page 7, lines 3-6, emphasis added)." All of the embodiments shown in Figures 6-10 show display cell (26) superposed on optical valve (28) with no polarizer disposed in between. Lastly, one definition of "superpose" is one upon another (Random House Webster's college dictionary, 1991, page 1341). Therefore, given (a) the definition of "superpose," (b) the definition of "superposed display devices" described in the specification (page 7, lines 3-6) and (c) as shown in Figures 6-10, it is clear that the phrase "two superposed contrast inversion display devices" recited in claims 1 and 13 does not allow for a polarizer to be interposed between the two contrast inversion display devices.

To reemphasize, claims 1 and 13 both recite a "display assembly with two superposed contrast inversion display devices." None of the embodiments disclosed in Figures 1A, 2A, 2B, 2C, 3A, 3B, 4A, 4B, 5A and 5B have "two superposed contrast inversion display devices" because each of these embodiments have a polariser (42) interposed between the display cell (26) and the optical valve (28). These embodiments all have three polarizers (40), (42) and (44) with the intermediate polarizer (42) interposed between the display cell (26) and the optical valve (28), whereas the display assembly in accordance with the present invention uses only two polarizers, neither of which is interposed between the display cell and the optical valve. Applicant asserts that there is no teaching in the EP 0926574 document disclosing, or even suggestion, that such a modification be made.

With respect to claim 2, the Examiner argues that "it is a basic principle for the liquid crystal display device to be switched from one state to another, so that the liquid crystal display is to be made visible or not visible, and using a mirror mask such as a reflector or a black mask such as a light shielding layer to increase the contrast...would have been at least obvious (Office Action, dated August 30, 2002, page 4, lines 17-20). The Examiner's "basic principle" argument lends to the appearance of an "Official Notice." Applicant respectfully traverses the Examiner's

Official Notice because the Official Notice is vague and does not provide a motivation to combine with the primary reference. Therefore, in accordance with MPEP 2144.03, the burden has been shifted to the Examiner to provide a reference or withdraw rejection of this claim.

With respect to claim 3, the Examiner argues that "it is a basic principle to switch the liquid crystal panel with two opposite switching mode, so that would be light display or dark display, that is two types of data of the second display being observed with a contrast inversion...would have been at least obvious (Office Action, dated August 30, 2002, page 4, line 21 to page 5, line 2). The Examiner's "basic principle" argument lends to the appearance of an "Official Notice." Applicant respectfully traverses the Examiner's Official Notice because the Official Notice is vague and does not provide a motivation to combine with the primary reference. Therefore, in accordance with MPEP 2144.03, the burden has been shifted to the Examiner to provide a reference or withdraw rejection of this claim.

Conclusion

In view of the present amendment, claims 1-4 and 7-19 are in compliance with 35 U.S.C. 112. Furthermore, Applicant has shown that the rejection under 35 U.S.C. 103 of claims 1-4 and 7-12 as unpatentable over Applicant's Prior Art discussion is untenable and should be withdrawn because none of the prior art display assemblies, or modifications thereof, include or even suggest "a display assembly with two superposed contrast inversion display devices" as recited in claims 1 and 13.

For all of the above reasons, claims 1-4 and 7-19 are in condition for allowance and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below signed attorney of record for the Applicant.

Respectfully submitted,

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MARKED UP VERSION SHOWING CHANGES

1. (Amended) A display assembly with two superposed contrast inversion display devices including a first display device, a second active display device having a double structure, one structure being formed by a first contrast inversion display device provided by a liquid crystal dot matrix display cell or by a digit liquid crystal display cell, the~~said~~ liquid crystals of the one structure being confined in a space delimited by two transparent substrates and having two switching states, and the other structure being formed by a second contrast inversion display device provided by a liquid crystal optical valve, the~~said~~ liquid crystals of the other structure being confined in a space delimited by two transparent substrates and having at least two switching states and control means allowing an appropriate voltage to be selectively applied to the display cell and optionally~~/or~~ to all or part of the valve to cause each liquid crystal~~them~~ to switch from one state to another, wherein a first absorbent or reflective front polariser is arranged at the front of the display cell and in that a second back polariser, crossed with the front polariser or parallel thereto, is arranged at the back of the valve so that~~,~~ when the display cell is switched to display at least one item of data, the total or partial switching of the valve, from one state to another, inverts the contrast of the data displayed from a light appearance to a dark appearance or vice versa, wherein the first display device has a dark shade and the back polariser is a reflective polariser, and wherein the first contrast inversion display device and the second contrast inversion display device are superposed~~as a function of the light or dark shade of the first display device, and the absorbent or reflective nature of the polariser placed at the back of the second display device~~.

2. (Amended) A display assembly according to claim 1, wherein the switching of the valve from one state to another also allows either the first display only to be made visible, or for the first display~~it~~ to be totally hidden by a mirror mask or by a black mask when the display cell is not switched.

3. (Not amended) A display assembly according to claim 1, wherein the valve includes at least two distinct zones with opposite switching mode, so that two types of data of the second display can be observed with a contrast inversion.

4. (Amended) A display assembly according to claim 1, wherein the liquid crystals of said display assembly are ~~of the~~ twisted nematic liquid crystals~~type~~ with either positive or negative anisotropy, which may be identical or different in the display cell and in the valve.

5. (Canceled)

6. (Canceled)

7. (Amended) A display assembly~~device~~ according to claim 1, wherein the transparent substrates opposite the display cell and the valve are combined in a single transparent substrate.

8. (Amended) A display assembly according to claim 1, wherein the first display device is selected from among an analogue device, a digital device, a combination of an analogue device and a digital~~these two~~ device~~,s~~ and a decorative element.

9. (Amended) A display assembly~~device~~ according to claim 7, wherein the digital part of the first display device and the second display device have the same~~has a comparable~~ structure~~ to that of the second display device~~.

10. (Twice amended) A timepiece including a case closed by a crystal and a back cover in which a clockwork movement associated with at least one display device is housed, characterized in that said display device is formed by a display assembly according to claim 1, said first display device essentially displaying time related data and said second display device displaying

time related data complementary to the preceding data or non time related data of sensor systems, or, alphanumerical processing systems, ~~for example alphanumerical,~~ integrated in the case of the timepiece.

11. (Not amended) A timepiece according to claim 10, wherein said first display device includes a dial above which move an hour hand, a minute hand and a second hand.

12. (Amended) A timepiece according to claim 10, wherein the second display is combined with the crystal.

13. (NEW) A display assembly with two superposed contrast inversion display devices including a first display device, a second active display device having a double structure, one structure being formed by a first contrast inversion display device provided by a liquid crystal dot matrix display cell or by a digit liquid crystal display cell, the liquid crystals of the one structure being confined in a space delimited by two transparent substrates and having two switching states, and the other structure being formed by a second contrast inversion display device provided by a liquid crystal optical valve, the liquid crystals of the other structure being confined in a space delimited by two transparent substrates and having at least two switching states and control means allowing an appropriate voltage to be selectively applied to the display cell and optionally to all or part of the valve to cause each liquid crystal to switch from one state to another, wherein a first absorbent or reflective front polariser is arranged at the front of the display cell and in that a second back polariser, crossed with the front polariser or parallel thereto, is arranged at the back of the valve so that when the display cell is switched to display at least one item of data, the total or partial switching of the valve, from one state to another, inverts the contrast of the data displayed from a light appearance to a dark appearance or vice versa, wherein the first display device has a light shade and the back polariser is an absorbent polariser, and wherein the first contrast inversion display device and the second contrast inversion display device are superposed.

14. (NEW) A display assembly according to claim 13, wherein the switching of the valve from one state to another also allows either the first display only to be made visible, or for the first display to be totally hidden by a mirror mask or by a black mask when the display cell is not switched.

15. (NEW) A display assembly according to claim 13, wherein the valve includes at least two distinct zones with opposite switching mode, so that two types of data of the second display can be observed with a contrast inversion.

16. (NEW) A display assembly according to claim 13, wherein the liquid crystals of said display assembly are twisted nematic liquid crystals with either positive or negative anisotropy, which may be identical or different in the display cell and in the valve.

17. (NEW) A display assembly according to claim 13, wherein the transparent substrates opposite the display cell and the valve are combined in a single transparent substrate.

18. (NEW) A display assembly according to claim 13, wherein the first display device is selected from among an analogue device, a digital device, a combination of an analogue device and a digital device, and a decorative element.

19. (NEW) A display assembly according to claim 17, wherein the digital part of the first display device and the second display device have the same structure.